

Boulder Clay present such a series. Its exhibition on the coast of Norfolk, although very limited, is accompanied by special palaeontological features that have caused it to be divided into the number of local beds which have been described by Trimmer, Green, Gunn, Wood, and Harmer, the author, Reid, Blake, and others. It includes the "Laminated Clays" of Gunn, the "Bure Valley Crag" of Searles-Wood, the "Westleton Shingle" of the author, and the "Rootlet-bed" and "Norwich Series" of Blake. Without reverting at present to the exact correlation of the several beds in the Norfolk area, respecting which there is still some difference of opinion, the author suggests that they should be included under a general term founded on the localities where, on the one hand, their varied palaeontological characters are exhibited, and on the other where their peculiar petrological characters are well marked—characters which the author proposes to show, in another paper, have a very wide range, and serve to mark an important geological horizon in some interesting questions of local physical geology. The Mundesley beds were described by the author in 1860, and consist of alternating beds of clay, sands, and shingle, some containing freshwater and others marine mollusca, with a forest-growth and mammalian remains at their base; and again in 1871, including them in his Westleton group (No. 5 in the author's sections), which he showed to consist entirely of great masses of well-rounded shingle, with intercalated seams containing traces only of marine shells. Seeing the inconvenience of attaching the same term to the two very distinct series of beds, and that it may conflict with other local terms, the author now proposes to group this series under the term of "The Mundesley and Westleton Beds," indicative of their stratigraphical position in Norfolk, and of characters in Suffolk which serve to trace them in their range westward and inland to considerable distances beyond the Crag area, to which alone these beds have hitherto been restricted. At the same time it may be convenient, for brevity, to use one term only in speaking of typical cases.

On the Upper Bagshot Sands of Hordwell Cliff, Hampshire, by E. B. Tawney, M.A., F.G.S.—The descriptions of former writers having been cited, it was found that there were two main views regarding the affinities of these sands, which occur in the cliff between Long Mead End and Beacon Bunny. The view formulated by the distinguished foreign geologists, D'Archiac, Dumont, Prof. Hebert, and Prof. C. Mayer, is that they are parallel to the upper sands of the Beauchamp (= Barton) period, and allied, therefore, to the marine Barton beds. This view is much the same as that of E. Forbes, and the Geological Survey, who called them the Upper Bagshot Sands. Latterly Prof. Judd has sought to revive the term Headon-Hill Sands for them, presuming them to be most nearly connected with the Headon series, and extending the bounds of that series to receive them. The author now gives a list of twenty-eight species obtained from the bed at Long Mead End; of these 35 per cent. are common to the sand and the Barton beds, but do not occur in the Headon series; while only 21.4 per cent. are common to the sand and Headon series, but do not occur in Barton beds. It is shown that this sand belongs to the zone of *Cerithium pleurotomoides*, Lam., and is exactly parallel to the sands of Mortefontaine, which belong to the same horizon, constituting the upper portion of the Beauchamp deposits. This is altogether below the *C. concavum* zone. From these sands being intimately connected with the Barton beds in both areas, it is held that the term Upper Bagshot is the most fitting designation that has been proposed for them.

NOTES

THE Emperor of Germany has, by Imperial Decree dated June 1, 1881, awarded the Gold Medal of Merit for Agriculture to Mr. Lawes and Dr. Gilbert jointly, in recognition of their services for the development of scientific and practical agriculture.

THE death is announced, at the age of sixty-two years, of Mr. Frederick Currey, F.R.S., F.L.S. Mr. Currey was well known as a botanist, and was secretary to the Linnean Society from 1860 to 1880. It is stated that Mr. Currey has left his valuable collections of fungi to Kew.

THE honour of knighthood has been conferred upon Dr. G. C. M. Birdwood, C.S.I., of the India Office; and also upon

Dr. John Kirk, H.M. Political Agent and Consul-General at Zanzibar, well known as the friend of Livingstone, and naturalist to his second exploring expedition, and as having done so much to promote African exploration.

THE Sedgwick Memorial Fund (Cambridge) now amounts from subscriptions and interest to more than 14,000/., but this sum is not sufficient to build the new geological museum which it has been decided to erect in honour of the late professor. As, however, the present museum was built partly by subscriptions collected mainly through the exertions of Prof. Sedgwick, with a view to the erection of a geological museum, as well as of the library and other University buildings, the value of the portion occupied by the present museum should be taken into account in estimating the sum available for the new memorial building. An architect has been consulted as to the possibility of erecting a new geological museum and a chemical laboratory on the vacant space in front of the new museums and lecture-rooms facing Pembroke Street, but after examination of his plans and report it was found that the proposal could not be carried out, and it has consequently been decided to await the result of further negotiations for the purchase of the contiguous property. The recent acquisition by the University of some adjoining land will, it is hoped, diminish the difficulties now existing in the way of finding a suitable site for the erection of the new geological museum.

A LONG and interesting article in the *Daily News* of Tuesday describes the progress which has been made in carrying out the scheme of Mr. Holloway for the erection of a college for the education of young ladies. Mr. Holloway's endowment is of the amplest liberality; the building is all that could be desired, and is in a fair way of being completed; there is no danger of the institution becoming one for the benefit of the teachers and not of the students; the programme of education is meant to place science on a footing of absolute equality with learning. "The governing body will consist of twenty-one persons, to be appointed partly by the University of London, and partly by the Corporation of London, and it is stipulated that a certain portion shall always be women. Religious opinions are not in any way to affect the qualification for a governor. It is the founder's desire that power by Act of Parliament, Royal charter, or otherwise, should be eventually sought to enable the college to confer degrees after due examination; and that until such power is obtained the students shall qualify themselves to pass the Women's Examination of the London University, or any examination of a similar or higher character which may be open to women at any of the existing universities of the United Kingdom. The curriculum will not be restricted to subjects enjoined by any existing university. Instead of being regulated by the traditions and methods of former ages, the system of education will be mainly founded on studies and sciences which the experience of modern times has shown to be most valuable, and as best adapted for the intellectual and social requirements of students. The governors will therefore be empowered to provide instruction in any subject or branch of knowledge which shall appear to them, from time to time, most suitable for the education of women; and the curriculum of the college will not discourage students who may desire a liberal education apart from the Latin and Greek languages." All this is admirable, and we trust the spirit of the founder's wishes will be faithfully carried out. This building and the Sanatorium are not far from Virginia Water, and the total cost, with endowments, will probably amount to close upon a million.

IN connection with the Smoke Abatement Committee, an International Exhibition and trials of smoke-preventing appliances will be held in the East and West Arcades, and in buildings adjoining the Royal Albert Hall, at South Kensington

from October 24 to November 26. Gold, silver, and bronze medals and certificates of merit will be awarded upon the report of a special committee. Regulations and forms of application for space may be had on application (by letter) addressed to Mr. Gilbert R. Redgrave, Superintendent of the Exhibition, Exhibition Buildings, Queen's Gate, South Kensington; or to Mr. W. R. E. Coles, Hon. Secretary to the Smoke Abatement Committee, 44, Berners Street, W.

THE Parkes Museum is closed until the end of September. In October it will again be opened free to the public on Tuesdays, Thursdays, and Saturdays, and during the winter lectures on sanitary science will be given in the Museum. The lectures will be illustrated with the sanitary appliances deposited in the Museum, which now include many new contributions sent from the recent Medical and Sanitary Exhibition at South Kensington. We believe it is intended to distribute the awards to the exhibitors at the Exhibition, at the second public annual meeting of the subscribers to the museum in October or November.

A NEW College of Practical Engineering has been opened at Muswell Hill, near London, under the auspices of a number of eminent practical engineers, among whom we may mention Sir John Anderson, late chief engineer at Woolwich, Sir Henry Bessemer, Sir R. M. Stephenson, Sir Joseph Whitworth, Bart., and Mr. Charles Manby, honorary secretary of the Institution of Civil Engineers. The principal of the College is Mr. John Bourne, C.E., author of several works on the Steam Engine and other kindred subjects. The instruction it is stated will combine the best theory with the best practice.

As a special number of the *Journal* of the Society of Telegraph Engineers, a valuable Guide-Book to the British Section at the Paris Electrical Exhibition has been issued, edited by Prof. W. E. Ayrton, F.R.S.

THE success of the Siemens electrical railway in Paris is very great, and the mode of locomotion very highly prized by Parisians. It is certain that steps will be taken after the Exhibition for rendering it a permanent feature of the French capital.

DURING the recent meeting of the British Association a conference of delegates from scientific societies was held, and the chair was occupied by Mr. W. Whitaker, F.G.S., Norwich Geological Society. The following resolution was adopted:—"That a committee be appointed, consisting of Sir Walter Elliot, F.R.S., Mr. H. George Fordham, Mr. John Hopkinson, Mr. G. J. Symons, F.R.S., and Mr. W. Whitaker, to arrange for a conference of delegates from scientific societies to be held at the annual meetings of the British Association, with a view to promote the interests of the societies represented by inducing them to undertake definite systematic work on a uniform plan; that Mr. Fordham be the secretary, and that the sum of 5/- be placed at their disposal for the purpose." An interesting conversation followed as to the best methods of stimulating the local societies to more active work. Mr. John Hopkinson, F.L.S., F.G.S., gave a most interesting account of the operations of the Hertfordshire Natural History Society. He had induced several members to take up the registration of the rainfall, and they had now twenty-eight observers of rainfall in their small county. Every one did not care about such observations, but there were plenty of other matters needing attention. Other members had been induced to take up the recording of the migration of birds, the flowering of plants, the appearance of insects, and other periodical phenomena; and the club furnished about one-third of the entire phenological observers of the Meteorological Society. They were also preparing lists of the fauna and the flora of the county, and one ornithologist was collecting a record of all the birds that are, or have been, observed in Hertfordshire. A resolution was unanimously adopted

appointing Sir Walter Elliot and Messrs. Fordham, Hopkinson, Symons, and Whitaker a committee to arrange for the next Conference, and to send out a circular to the local scientific societies pointing out the work of the various committees of the British Association to which they might render aid, and other scientific work of a systematic character that they might usefully undertake.

AT a recent meeting of the Banburyshire Natural History Society Mr. E. A. Walford read a note "On the Occurrence of a Fire-ball at Watergall" on August 23. In answer to Mr. Walford's queries, Mr. Fessey, jun., had sent an account as follows, dated "Watergall, Leamington, August 30:—As regards the fire-ball, I was about 200 yards from it, in a waggon hovel. I saw it directly it left the sky, as I was looking in that direction at the time. When I first saw it, it looked like a ball of fire, about as large as a dinner-plate. It slowly descended, and I have no doubt I could have run twenty yards from the time I first saw it until it struck the ground; but when about fifteen to eighteen feet from the ground, it exploded with a loud crash, quite as loud as a cannon, distinctly before the thunder, which was very loud also. The explosion shook the whole buildings. I certainly thought the slates were falling in, but when it exploded one part struck the hedge, making a hole in the ground about a foot deep, and laying all the roots bare, but not damaging them. For some time the place looked all on fire, and there was a considerable quantity of smoke when it hit the ground, lasting for a second or two. It was seen by myself and four men. They also agree with me that this is as near as possible a correct explanation of it. We dug the hole out yesterday, but found nothing. The soil was blackened for several inches deep."

DR. C. S. MINOT, in a paper read at the Cincinnati meeting of the American Association, recommended the following method of mounting chick embryos whole. The blastoderm is removed and cleaned in the usual manner, and then floated out on a glass slide, where it remains permanently. It is carefully spread out and allowed to dry until the edges become glued to the slide. It is then treated with a 0.5 per cent. osmic acid solution, until a slight browning occurs. Stain with picricarmino. The next step is particularly important, because it prevents the further darkening by the osmium, which otherwise injures or ruins the specimen. Pour Müller's fluid, or 0.5 per cent. chromic acid solution, on the slide, and leave it over night. The next morning the blastoderm is ready for dehydration by alcohol, and mounting in the usual manner in balsam or Dammar lac. Embryos prepared in this manner make particularly beautiful specimens.

THE winter session of the Charterhouse Science (the largest in the United Kingdom) and Art School and Literary Institute will, under the presidency of the Rev. Henry Swann, M.A., commence on September 24. During the late session about 700 students attended this institution; and of this number nearly 500 presented themselves for examination, and were successful in obtaining no less than 100 Queen's prizes. At a nominal fee instruction of a practical character is given in most of the sciences. Chemical students have the opportunity of working in a well-fitted laboratory capable of holding sixty students. During the session Mr. W. B. Carpenter, F.R.S., will deliver a course of lectures on physiology, to which teachers will be admitted free. This will prove a great boon to the teachers of the metropolis. Dr. Gladstone, F.R.S., Prof. Farrar, Mr. Sydney B. J. Skertchley, F.G.S., and others will lecture during the session.

THE Berlin Museum is now the fortunate possessor of archaeological treasures which are perfectly unique. They are the long-expected sculptures from the Central American field of ruins at

Santa Lucia de Cosumalgapán, Guatemala, purchased for the Museum by Prof. Bastian when upon his American journey.

A SEVERE earthquake was felt three weeks ago in the southern part of the North Island, New Zealand. No lives were lost, but in some of the townships in the Manawatū district scarcely a chimney was left standing. In Foxton, for instance, no less than 250 were thrown down. Fissures extending for many miles are reported to have been made, and the railway line was rendered unsafe in that neighbourhood, owing to the undulations of the earth alternately raising and depressing the rails. Since the large shock a good many of a slight nature have occurred. Two shocks of earthquake, each lasting from four to five seconds, were felt at noon on September 2 at Spalato in Dalmatia. The earthquake, which was accompanied by a subterranean rumbling, passed from the south-west to the north-east. It also made itself felt in the neighbouring islands of Brazza and Mascarsa, and in the town of Sebenico. A shock of earthquake was distinctly felt by several individuals at Courtown House, Gorey, Ireland, on August 27, at a quarter to five o'clock. Many heard a rumbling noise as of thunder, some noticed the rattling of doors and windows, and one experienced what he called a "shiver." Lord Courtown noticed a rumbling noise, coming apparently from the north, passing under the house, and so away to the south; the door of the room in which he was sitting rattled. A slight shock of earthquake was felt at Naples at eight o'clock on Saturday morning. At about the same hour severer shocks took place at Popoli, Pescara, and Orsogna, in the Abruzzi. The seismographic instruments on Mount Vesuvius show great activity. In the Abruzzi the earthquake shock has damaged several houses at Chieti and Castelfrentano, where some people have been wounded. At Lanciano two people were killed. At Orsogna one was killed and several were wounded. At Atessa the church of St. Giustina was seriously damaged. There is a great panic everywhere amongst the population. A shock of earthquake occurred at Sanpietro Brazza (Dalmatia) on August 29, at 9 p.m. It lasted four seconds. On September 2, at 10.48 a.m., two strong oscillations were felt at Signi, Spalato, and Brazza (in Dalmatia). Direction east-west. Over forty shocks of earthquake have been felt at Khoi, Persia, between the 28th ult. and September 11. Some houses were destroyed, but no lives have been lost. Most of the inhabitants have left the town, and are encamped outside. The direction of the earthquakes was from north to south. The shocks were accompanied by rumbling noises.

A TERRIBLE disaster has occurred at Elm, a village in the Canton of Glarus. The place has been almost destroyed by a fall of rock. It is believed that at least 200 persons are buried beneath the ruins.

THE German Ornithological Society held its annual meeting early this month at Hamburg. Prof. Landois (Münster) spoke on birds' nests and on the origin of egg-shells; Dr. Reichenow (Berlin) on the classification of ducks.

ACCORDING to the last report of the director of the Central Sanitary Bureau of Japan, the Central Government has granted the necessary funds for the establishment of a hospital in the capital for the special treatment of *kakke*, a disease which has been spreading more and more in the country, and one of the usual symptoms of which is œdema of the legs. It is intended to investigate carefully the causes and proper treatment of the disease at this institution. The average mortality, from all causes, is given at 10.43 in every 1000 of the population, and is stated to be lower than that of places in Europe and America under similar conditions. The director observes, however, that the registration of deaths is not efficiently carried out; but measures are being taken to render this as complete and

accurate as possible. It is noticeable that deaths from diseases of the digestive organs and nervous disorders greatly preponderate over all others. In the former the proportion is 24.1 per cent., and in the latter 23.1. Small-pox was the most destructive epidemic of the year, but the number of annual vaccinations is largely increasing. During the year covered by the report it was 1,659,298.

THE second part of Dr. Lang's "Butterflies of Europe" is before us, and quite justifies our mostly commendatory remarks in a recent number. When the work more nearly approaches completion we may probably again find occasion to notice it.

FROM Surgeon-Major Bidie's Report on the Government Central Museum at Madras, we see the number of visitors during 1880-81 was less than in the previous years, due, however, to trivial and temporary causes. The total number of visitors was 173,898, of whom 39.36 were women and girls. Many of course go simply for curiosity, but a very considerable number visit the museum for the express purpose of obtaining information, and there seems no doubt that, under Mr. Bidie's energetic and intelligent management, the institution is doing much good. Very considerable additions have been made during the year, and the whole is in a fair way of being catalogued.

THE additions to the Zoological Society's Gardens during the past week include two Greater Black-backed Gulls (*Larus marinus*), British, presented by Mr. A. Allen; a Blue-shouldered Tanager (*Tanagra cyanoptera*) from South America, presented by Mr. Ernest L. Marshall; a — Tanager (*Tanagra*, sp. inc.) from Brazil, presented by Dr. Arthur Stradling; a Green Lizard (*Lacerta viridis*), South European, presented by the Misses Parry; two Pantherine Toads (*Bufo pantherinus*) from North Africa, presented by Mr. R. E. Holding; six Common Lizards (*Lacerta vivipara*), two Smooth Snakes (*Coronella levius*), two Sand Lizards (*Lacerta agilis*), British, presented by Mr. J. T. Mann; a Grey Parrot (*Psittacus erithacus*) from West Africa, four Passerine Parrakeets (*Psittacula passerina*), two Lineated Finches (*Spermophilus lineatus*) from South America, a Goffin's Cockatoo (*Cacatua goffini*) from Queensland, deposited; :ix Common Chameleons (*Chamaeleo vulgaris*) from North Africa, purchased. The additions to the Insectarium include larvae of the Tusseh Silk Moth (*Attacus mylitta*); several larvae of the Poplar Hawk Moth (*Smerinthus populi*), presented; an imago of the Death's-Head Moth (*Acherontia atropos*), presented by Mr. M. H. Temple, Warwick, and two specimens of *Ceratocampa ixion*, bred from pupæ received a short time since from South America; also many species of aquatic Coleoptera from Askham Bog, near York, presented by Mr. W. A. Forbes, including *Halipus elevatus*, *Hyphydrus ovatus*, *Hydroporus rufifrons* and *lineatus*, *Colymbetes exoletus* and *grapei*, *Ilybius ater* and *uliginosus*, *Agabus dispar* and *abbreviatus*, *Noterus sparsus*, *Helophorus aquaticus*, *Hydrobius fuscipes*, *Philhydrus melanoccephalus*.

OUR ASTRONOMICAL COLUMN

THE DEARBORN OBSERVATORY, CHICAGO.—The annual report from Prof. Hongh to the Board of Directors of the Chicago Astronomical Society, dated May last, has been issued. The planet Jupiter has been made a special object of study with the great equatorial, the first observation having been secured on May 6, 1880, and the last on January 30, 1881. The observations made at the Dearborn Observatory do not support the idea that the surface of the planet is "subject to sudden and rapid changes, which may be accomplished in a few days or even a few hours." On the contrary, the observations in question show that all minor changes in the markings or spots have been slow and gradual. "In fact the principal features have been permanent, no material change being detected by micrometer measurement." With regard to the rotation of Jupiter, the discussion of the measures on the great red spot made from September 25, 1879, to January 27, 1881, or over a period of 490 days, gave